Shared Services in Information Technology and Supply Chain Management

Author: M.N.A. Loges
University of Twente
P.O. Box 217, 7500AE Enschede
The Netherlands
m.n.a.loges@student.utwente.nl

After the emergence of shared service centers shared services became most common in the fields of Human Resource Management and Finance. On the contrary, fields such as Information Technology and Supply Chain Management are on the rise, yet in connection with shared services little theory has been published. This paper aims at finding special characteristics concerning the organization of shared services in the field of Information Technology (IT) and Supply Chain Management (SCM). By applying a dimensional framework to the sample of IT shared service and SCM shared service literature, information was extracted in an in depth literature review. The results showed that administration as a dimension was most elaborated in literature. Dimensions such as centralization, standardization and control were in both fields often mentioned in articles, nevertheless never fully examined. Besides the difference of having to manage different activities within IT and SCM, both fields showed similar overall characteristics such as the need of experts for sophisticated information systems.

Supervisors: Dr. T. Bondarouk
Dr. J. Meijerink

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1. INTRODUCTION

As companies expanded globally, control of processes became more difficult (Davis, 2005). Thus, opting for centralization was a means of pursuing to keep an overview. With centralization, the idea developed to create services which could be shared by different parties in certain functions such as human resources, supply chain management (SCM), finance and information technology (IT) (Bergeron, 2002), which additionally led to so-called 'Shared Service Centers' in order to "consolidate processes within a concern in order to reduce redundancies" (Schulz, Hochstein, Uebernickel, & Brenner, 2009, p.9). Historically, the first shared services were established in the late 80's (Davis, 2005). The aim of implementing shared services was reducing costs, centralizing by standardizing and with a higher control and increased information it was possible to benchmark more effectively (Aron & Singh, 2003; McDowell, 2011). The fields in which shared services have been most common were according to Turle (2010), Human Resource Management and Finance. Consequently, one might wonder what has been known in fields such as Information Technology and Supply Chain Management. With the recent trend towards expanding the research in the field of IT, for example the fast development of cloud computing, an interesting aspect would be to consider shared services in information technology. This might be a hot topic in the near future, as data centers for pure IT purposes develop rapidly. More slowly but also developing are functions in relation to purchasing and supply chain management. Companies source globally, thus at some point they have to opt for a centralized data center in order to overlook the extensive amount of collected data and make it available for all subsidiaries (Davis, 2005). This might be a point of interest a bit further in the future, yet a first move towards it would be an interesting indication for further researches. Thus, in order to gather new knowledge, the fields will be compared with articles about shared services in general in order to use the combined outcome for further insights. Consequently, the following research aims at answering the question: What are the special characteristics in organizing shared services in the field of Information Technology and Supply Chain Management?

In the second section a literature review will clarify terms and the framework, which will be used for the analysis of the sample. In the third section, the search process of establishing a sample of relevant articles will be described as well as the outcomes of the search paths. In the following, section 4 will determine characteristics of shared services in general based on the most important authors in shared services in general according to Miskon, Fielt, Bandara, and Gable (2013), and then elaborate on characteristics of shared services in the fields of IT and SCM based on the sample. Those characteristics will be based on a framework consisting of organization structure literature in order to find a basis for a common comparison. Next, section 4 highlights the findings of the analysis of the sample and section 5 discusses particular specialities of shared services in IT and SCM. Lastly, section 6 will provide a conclusion with future outlook.

2. LITERATURE REVIEW

2.1 Definitions

2.1.1 Shared Services

Shared services were defined by Janssen, Joha & Zuurmond (2008) as "the concentration of dispersed service provisioning activities in a single organizational entity" (p.16). According to Groenroos (2001) the main features of services are related to a steady interaction of the service provider and the client, to creation and usage of service occurring at the same time and to involvement of the customer in the service delivery process. Altogether, shared services enable an organization to execute a particular kind of sourcing with strategic objectives in the long-term (Bergeron, 2003).

2.1.2 Information Technology

According to Merriam-Webster Dictionary (n.d.), information technology describes "the technology involving the development, maintenance, and use of computer systems, software, and networks for the processing and distribution of data". Concerning shared services in the information technology sector, Scannell and Bannister (2012) mention cloud computing being on the rise. Examples for frequently used web and software technologies are web filtering software, geographical software, websites and anti virus systems. Lee et al. (2007) describe different kinds of electronic communication appliances such as networks, digital broadcasting, convergence servicing tests, certifications and mobile communication tools.

2.1.3 Supply Chain Management

According to Monczka, Trent, and Handfield (1998), supply chain management refers to the management of sourcing, flow and control of materials starting with the supplier and ending with the end user. SCM comprises activities such as manufacturing, purchasing, distribution and sales (Houlihan, 1988). Important values are qualitative customer service and keeping inventory and unit costs low (Stevens, 1989). Ultimately, SCM opts of optimization and visibility of supply chain processes, for example improving manufacturing activities (Kang & Lee, 2013). This particular field complies various inter-related disciplines inter alia asset management, order and delivery management, warranty management, and maintenance management. Enterprise resource planning systems, intranet and call-center transaction applications are part of the used technological premises (Herbert & Seal, 2012). An example of a typical day-to-day activity in SCM is the procure-to pay process, which consists of the following steps: after offering tenders and receiving bids, decisions are made on supplier selection. Next negotiation and contract management follow in order to come to terms and find a common agreement between the customer and the supplier. After that, the order or service is processed and distributed (Davis, 2005). In literature, shared services in SCM involve contracts such as information technology sharing, laundry service and insurance programs (Griffin, 1981).

2.1.4 Organizational Structure Framework

In order to explore shared services in different fields a comparative model has to be established. In literature many authors have defined organizational structure by using particular characteristics. Organizational structures, which have been examined for quite some time and very important articles date even back to the 1950's (Scott, 1975). According to Hatch (1997), structure points out the "relationships among the parts of an organized whole" (p.161). Structural dimensions which will be used in this paper are based on Nelson & Quick's (2007) theories. The following 5 dimensions will be chosen in order to serve as a framework :

Centralization describes whether the setup of the company and its decision-making is centrally or de-centrally constituted (Hall 1967). Further, it is characterized by the decision authority being assigned to the top level of an organization (Nelson & Quick, 2007). Centralizing a shared service center targets cost reductions and an increase in power by shifting the decision making authority to one board or top level (Davis, 2005;

Scannell & Bannister, 2012). Information will be more easily accessible .

Standardization relates to the degree of how often a process or procedure takes place in a company (Pugh et al., 1968). Additionally, organizations, which strongly standardize have little flexibility concerning their job definitions (Nelson & Quick, 2007). Work, outcomes and skills can be standardized. The implementation of routinized processes relates to the intention of cutting redundant tasks and to achieve cost savings by achieving economies of scale (Scannell & Bannister, 2012). In this way, centralization and standardization both aim at decreasing unnecessary processes and redundant information.

Complexity consists of vertical, horizontal and spatial dispersion of tasks within an organization (Hall, 1967; Hall, 1996). Moreover, it relates to the "amount of differentiation needed within the organization" (Nelson & Quick, 2007, p. 360). Within different fields there are usually different tasks, thus considering the complexity of the work force within both fields is crucial in regard to finding special characteristics within IT and SCM.

Control is based on a bureaucratic structure regarding the division of responsibilities and measurements in order to provide an overview and maintain a distinctive direction (Weber, 1947). Performance management and top quality management are executed via control mechanisms in order to keep an eye on financial data and the overall performance of the shared service center (Becker, Niehaves, Krause, 2009; Goh, Prakesh, Yeo, 2007). Additionally, control is important in regard to audit compliance (Griffin & Adams, 1981).

Administration will be based on the structural dimension formalization according to Nelson & Quick (2007), but in combination with the dimension specialization in order to discover specialized administrative tasks within IT or SCM. Formalization refers to the extent to which rules, regulations and procedures are used, while specialization emphasizes the extent to which tasks are particularly defined. Administrative tasks are important in order to maintain the focus on a particular direction or goal (Griffin & Adams, 1981).

As all those dimensions play an important part in order to achieve benefits through a shared service, they will be taken as comparative framework in the following sections.

3. METHODOLOGY

3.1 Selection of Data

The sample consisted of a selection of articles. In order to gather a comprehensive database of articles, the search process was developed according to distinctive criteria. The criteria were based on the main key words such as "Shared Services", " Shared Service Center", " Purchasing", "Supply", and " Information Technology". As for the field of SCM, articles were rather scarce, two search terms, "Purchasing" and "Supply", were included in order to find a bigger selection of articles. The following search engines were used: Scopus and Science Direct. Key words and their variations were used in subject, topic and keyword areas of the two search engines. Figure 1 illustrates one of the search paths used for finding articles. In this particular example, the search engine used was Scopus, in which the input of the search words "shared services" led to 2614 hits. Further narrowing down the amount of articles in order to collect only the most relevant and specific ones, the subject area "Computer Science" was selected, leading now to only 189 hits. In the following, adding the key words " Shared Services" and " Shares Service Center" resulted in 100 hits. The abstracts of those particular articles were then examined and judged regarding their relevance and redundancy by three researchers. The final articles which were used from the before mentioned search path with the search engine Scopus amounted to 12.

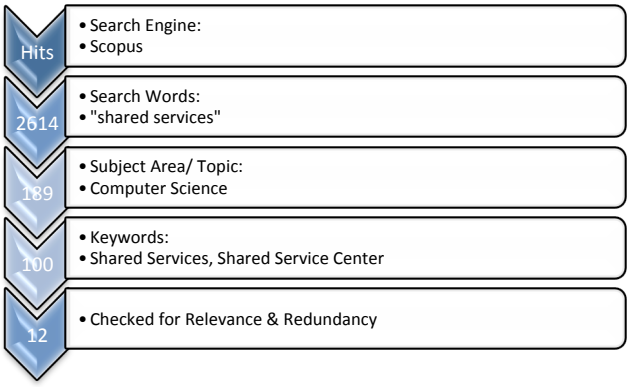

Figure 1. Search Process IT Example

Altogether, without the individual abstract scanning by the researchers, the amount of general shared service articles being found accumulated to 128 hits (Appendix). For IT, 164 hits were extracted from the usage of the search engine and for SCM, 128 hits were found (Appendix). The three researchers agreed in 100 percent of the cases on the selection of articles during the abstract scanning. After scanning abstracts and fully reading the articles, the final sample consisted of 19 articles for IT and 8 articles for SCM. Altogether, quantitative as well as qualitative literature was equally taken into account. In addition, literature from professional and academic sources was also not discerned.

3.2 Analysis

3.2.1 Framework

A framework created by 5 different dimensions based on the theories of Nelson and Quick (2007) will be used to compare shared services within different functions to find special characteristics. The dimensions consist of centralization, standardization, administration, complexity and control.

Table 1. Explanation of Dimensions

Dimension	Explanation
Centralization	Centrally oriented decision making
Standardization	Routinization of procedures and processes
Administration	Procedures, regulations, formal job description
Complexity	Distribution of tasks within the work force
Control	Placement of power

3.2.2 Evaluation of Dimensions

After reading the final set of articles, an analysis was made by distinguishing in which articles which dimension was mentioned. A distinction was made between only mentioned or further elaborated. If the dimension was only mentioned in the article, for example as a benefit of shared services, then a score of "1" would be written down. If the article provided more than that, a "2" would be recorded. In case of a thorough elaboration of a dimension a "3" would have been written down, however, as literature was scarce and so was the content about each

dimension a "3" could not be given. With regard to the case that an article would not mention a dimension at all, a "0" would be given. Table 1. Illustrates the amount of articles that mentioned each dimension per function, as well as the score, which ranged from "0-3" per article and was then aggregated.

Table 2. Mentioned Dimensions within the Sample

Dimensions/Field	IT Shared Services (19)	SCM Shared Services (8)
Centralization	10/score: 10	7/ score: 8
Standardization	11/score:11	7/score: 9
Administration	16/score:17	8/score: 12
Complexity	15/score:20	7/ score: 8
Control	11/score:12	5/ score:8

In this way, tendencies and patterns could be examined. In the following, each article was in depth analyzed and notes were taken by the researcher. The intent was to find data on each dimension in order to find specific details that would help to answer the research question in the following. Next, those particular notes were compared within the two fields in order to find special characteristics and/or differences within a certain dimension across all articles (Appendix). All notes were ultimately compared and evaluated.

4. FINDINGS

4.1 Centralization

According to Janssen and Joha (2006), shared services can inherit advantages of centralization as well as decentralization. However, while opting for economies of scales within a centralized shared service center might hinder the ability to properly focus on the needs of the customer (Bergeron, 2003). Nevertheless, even though productivity rises, costs and risks may increase as well which might lower the attractiveness of outsourcing (Fowler & Jeffs, 1998). Concerning personnel ratios, a centralized shared service center incorporates a process that used to be repeated in each subsidiary. However, with centralization unnecessary tasks are expected to be eliminated, which facilitates transparency as the task is done only in one location. Altogether, as the complexity of the structure is promised to decrease, communication and control are expected to improve (Bauer, 2003).

In IT shared services the IT service provider acts as main hub within a centralized structure (Becker, Krause, Niehaves, 2009). Cost reductions of 25 up to 30 percent can be achieved, for example by avoiding redundancy of tasks and information (Scannell & Bannister, 2012). Next, to sharing IT cost-benefits, the responsiveness of a centralized shared service center is quick due to specialization (Borman & Janssen, 2012; Guo, Chang, Sun, & Wang, 2010). Also related to this phenomena is the reduction of used IT systems to very few or only one central information system which makes it easier to respond faster to requests (Goh, Prakesh, Yeo, 2007). Centralized controllers arrange the allocation of resources for the requested provision of services (Zhang, Xiao, Gurses, Karsten, & Boutaba, 2010).

A shared service center is a new way of centralizing support functions, especially in supply chain management (Herbert & Seal, 2012). Such a center lies between line management control and the open market, thus represents a hybrid (Rothwell, Herbert, Seal, 2011). With centralization, departments are being rationalized and optimized (Turle, 2010) as well as being combined. Information is made more transparent and can be accessed from one entity (Griffin, 1981). Execution of tasks such as order-to-cash transactions and payments in general have an enhanced span of control due to access to extensive data (Davis, 2005). In the following, a decrease of stored inventory and operating costs will lead to overall cost savings and enhanced efficiency. With more data, customer requests can be processed more effectively conveying possibly increased customer satisfaction (Davis, 2005).

4.2 Standardization

Standardization within shared services is believed to enable an organization to reduce costs and allow economies of scale. Dispersed and routinely done tasks are being combined in order to decrease redundancy of processes but increase efficiency of that particular process (Davenport, 2005). However, as some services cannot be standardized due to the high degree of customization for occasional needs, efficiency may be lost in those particular cases (Wagenaar, 2006).

Within the IT function standardization applies to applications and processes (Miskon et al., 2013). The underlying architecture has to be adopted according to the choice of the main ICT system and the specialization of the service center (Scannell & Bannister, 2012). Specializing can lead to the utilization of best practices (Borman & Janssen, 2012). Standardization can be used for services as well as corporate policies or standards, thus dividing the usage into strategic or operational purposes (Grant, McKnight, Uruthirapathy, & Brown, 2006). Standard internet protocols are for example used with web services (Baida, Gordijn, Omelayenko, 2004). Altogether, application categories for IT services are for instance portal applications, flow applications, common web applications (Guo et al., 2010). Moreover, not only software but also hardware can be standardized (Becker et al., 2009).

While standardizing information processing, common metrics are usually established for creating unity (Davis, 2005). Routinizing tasks implies a certain degree of re-engineering of an activity. Skilled and specialized employees are thus needed, leading to a decrease of career opportunities for the common lower level technician (Rothwell et al., 2011). Herbert and Seal (2012) mention with the example of standardizing administrative systems, junior staff which is not as costly as well as top experts and professionals which are experienced should be employed in order to establish and maintain a new focus of a new service center. According to Kang and Lee (2013), key services such as EPCIS, ONS and DS need to be easily usable, by standardizing and combining them.

4.3 Administration

The implementation of shared services requires re-engineering of business processes, which includes implementing new information systems that anticipates involvement of various administrative tasks. Activities related to the implementation of shared services are the development, maintenance and control of information systems (Ulbrich, 2006). Moreover, administration has to manage schedules, expansion and further changes of the service organization (Grant et al., 2006). Mutual learning of the different parties involved in the service has to be guided and an overall focus on goals has to be kept (Janssen & Joha, 2006). With specialization in a particular function, shared service centers can enhance service levels provided to users. Along the change new and transferred administrative and transaction oriented tasks can add focus capabilities and strategic value (Quinn, Cooke, & Kris, 2000; Truss, 2008).

Accordingt to IT shared service literature, administration needs to manage managerial and tactical activities within the governance structure of a shared service center. This includes coordinating customer focus, service mix, proper locations, cost recovery, risk management, performance management and legislative compliance (Grant et al., 2006). Within a service-oriented architecture, next to transaction-based services such as

routine tasks like development and learning activities, administration has to take care of IT user support, server management and the organization of programming activities (Nasir, Abbott, & Fitzgerald, 2011; Yale-Loehr, Schlesinger, Rembert, & Blake 2010; Godse, 2012). After integration and customization of applications the remaining staff has to be trained and receive scheduled plans about the future usage in order to understand the direction of action (Becker et al., 2009; Goh et al. , 2007; Guo et al., 2010). Newly introduced ICT applications have to be aligned with the overall direction and performance goals have to be set (Scannell & Bannister, 2012). As processes become more defined, communication systems need to actively transmit the necessary information (Goh et al., 2007). The administrative tasks are enhanced via different computing modes, communication protocols and data structures via hosting platforms (Bai, Shu, Yang, 2008). By using cloud computing, which means sharing hosting platforms for content delivery networks (Zhang et al. , 2010), a heterogeneous database access is provided (Qian, 2010). Acting as a process facilitator and information flow provider, information technology helps to lower administration costs while improving the processing of tasks with tools such as tagging of metadata or advanced search and description mechanisms (Pinto, 2010). With improved IT based technologies, administration has to entrench new policies as well (Lee et al., 2007).

Administrative tasks within SCM shared services also focus on the goal of costs savings, additionally complying with government audit regulations adds another key factor for retaining a service center (Griffin, 1981). Solutions for obtaining savings in cost management are related to re-thinking and re-engineering of tasks, transparency is crucial in this way (Herbert & Seal, 2012). Altogether, savings are likely to be made with purchasing activities, especially in case suppliers agree to join shared services. Established procurement rules guide suppliers in order provide bids for tender (Turle, 2010). Purchases can be done on regional as well as on a global level with the advantage of choosing the supplier with the most competitive prices. Foreign currency fluctuations have to be considered when contracting a supplier (Davis, 2005). By expanding the scope of potential suppliers, traceability requirements of multiple industries need to be considered (Kang & Lee, 2013). Additional administrative tasks include recording of day-to-day activities, with summarized reports on a constant basis, which are being made accessible to all stakeholders, transactions including service costs (Turle, 2010). Moreover, planning and scheduling for example in shared services for hospitals need to be arranged and coordinated by the administrative staff. In this way authority and accountability have to be considered when it comes to administrative responsibilities (Ratz, Chenoy, Morrison, 1991).

4.4 Complexity

The type of the service being shared can vary greatly as well as the extent to which the service is being shared (Bergeron, 2003). Tasks which are being shared do not only include minor technicalities such as sharing a website but also entire functions such as finance (Janssen et al., 2008). Depending on the internal organization, shared service centers are bound to restrictions (Janssen & Joha, 2006). Capabilities might be set to the usage of internal resources to exclusively internal clients, which hinders the achievement of advantages of potential economies of scale (Janssen & Joha, 2006). User groups have to be trained to work in specialized fields, thus experts are needed. As information systems are involved, architectures of the information infrastructure need to handled and updated by specialist teams. Communication between clients and specialist teams has to be organized by for example account managers (Janssen & Joha, 2006).

Within IT shared service centers, requests and processes occur between three main entities: the infrastructure provider that hosts the environment, which is used for services by the service provider (the shared service center). The service provider rents or might even own the platform used for services. And lastly, the client, which requests and makes use of the outcome of the offered service (Zhang et al. , 2010). Thus, relationships between those entities create a commercial aspect and the provision of competitive pricing models (Godse, 2012). Strategic management with strong central leadership skills is thus important, especially during the implementation of shared services (Scannell & Bannister, 2012). Changes can lead to dissatisfaction at the user level. Introduction of new processes to the staff is important and part of the staff relationship management (Borman & Janssen, 2012). Senior leadership, a help desk and comprehensive training are part of the implementation process of shared services as well as the time after the implementation (Borman & Janssen, 2012). Employees undergo training in for instance enterprise resource planning systems such as SAP in order to become familiar with the new technology (Nasir et al., 2011). With an improvement in knowledge and skills of worker, the organizational knowledge increases as well (Pinto, 2010). The service provider also maintains a help desk for customers in regard to technical support activities (Nasir et al., 2011). With an IT service management approach and an information technology infrastructure, an information architect is required to align goals with technical implications (Janssen & Joha, 2006). Further functions of the staff include information modeling experts, business-oriented domain experts, software engineers and programmers (Baida et al., 2004).

During the implementation process of SCM shared services and also after, communication is key in order to keep the work force up-to-date and involving them into the new processes. Dissatisfaction due to inexperience is then less likely to occur (Rothwell et al., 2011). Barriers of communication can be overcome by combining roles and functions of the support department (Turle, 2010). According to Davis (2005), with new shared services finance support staff could be reduced which ultimately lowered the working capital. Office clerical tasks and specialized IT related tasks within SCM were involved in the majority of operations. Service level agreements provided the basis for business. External expertise is possibly to be used by closely engaging with vendors for sourcing (McIvor, McCracken, McHugh, 2011). Functions of employees were part of teams efforts for end-to-end processes for swim lanes, which means process streams particularly in shared service organizations, of accounting related tasks (Herbert & Seal, 2012). In the shared service center, common accounting manager would now have to further process specific financial information provided by the central service center and via the enterprise resource planning system, instead of mainly creating financial information. Activities include for example, procurement-to-pay transactions (Herbert & Seal, 2012).

4.5 Control

A shared service center is a business unit, which is organized and controlled semi-autonomously (Bergeron, 2003). The structure of control is based on the promoted goal of the organization for the services, for example aiming for cost savings or value generation. Performance management within shared services is thus directed by the specialized task of the shares service center. The offered service enhances the contribution of effectiveness and efficiency to the parent

corporation (Forst, 2001). Monopolization and bureaucratization are a challenge within the control structure, therefore, agreeing up front on conditions is important (Wagenaar, 2006). Service level agreements ensure the recording and execution of those conditions. Nevertheless, they have to be updated and reviewed on a constant basis.

As control is driven by financially oriented goals, tier-boards, executives, committees and boards from different levels such as managerial or tactical all take interest in outcomes of projects and activities (Becker et al., 2009; Grant et al., 2006). Engagement of stakeholders creates the need to distribute and share accountability (Scannell & Bannister, 2012). In order to facilitate the decision making process in IT processes with that many interests a unified decision making platform is helpful where data is shared in a business service layer (Guo et al., 2010). For quick execution of decisions and tasks, service level agreements provide guidance and the agreed on conditions (Godse, 2012). They can also be used for performance measurement, for example by creating an enterprise resource planning transaction analysis (Nasir et al., 2011). Top quality management with clear performance metrics ease benchmarking processes (Goh et al., 2007). An open system exchange with a semantic web related platform and communication support controlling activities (Pinto, 2010). Mitra & Poellabauer (2011) mention novel subscription languages that enable the sharing of network connections and database access more effectively and efficiently.

With influence from the market and in-house management, the shared service center is semi-independent and so is its span of control (Herbert & Seal, 2012). Different parties such as customer, supplier and top management from the corporation take interest in outcomes and developments of the SCM shared service center (Ratz et al., 1991). Overall procurement rules guide staff and teams in supply chain management processes (Turle, 2010). Regulations in different countries imply different contractual structures, which have to be taken into account during the purchasing process. The purchasing body manages supplier relationships, payments and governance of contracts. However, strictly following established procurement rules leaves less space for flexibility during contracting.

4.6 Reflection

Table 3. Reflection on Dimensions

Dimensions/Field	IT Shared Services	SCM Shared Services
Centralization	Centralizing by combining	Centralizing by combining
Standardization	Hard- and software	Administrative systems
Administration	IT specific tasks	SCM specific tasks
Complexity	IT dependent tasks, experts	IT dependent tasks, experts
Control	semi-autonomous, applications for control processes	semi-autonomous, procurement rules

Table 2 shows briefly that based on the literature sample most dimensions seem to be similarly structured with the only difference that activities differentiate. In both fields, information systems are used in order to enhance efficiency and effectiveness of tasks.

5. DISCUSSION

With the aim of finding special characteristics in organizing shared services in the field of Information Technology and Supply Chain Management, a final sample of 27 articles has been found that was analyzed in order to provide an answer to the research question. In regard to all articles, there was very little mentioned about each dimension. Dimensions that were more often described were in the field of IT, administration and complexity, with a few further elaborations. In SCM, the most worked out dimension was administration. Altogether, administration was thus the dimension that was in both fields more thoroughly described than the other dimensions. Thus a tendency of administrative implications in both fields was observed. Altogether the following was found:

In centralization, there were no particular differences or special characteristics in organizing shared services found in IT and SCM literature. Nevertheless, centralization has been mentioned in IT shared service articles as well as SCM shared service articles. In IT 10 out of 19 articles mentioned centralization, whereas 7 out of 8 articles in SCM mentioned this particular dimension. One article in SCM elaborated about centralization instead of just mentioning it as benefit. The most relevant reason that led to centralization and the implementation of shared service center is cost reduction, which was mentioned in all SCM articles and in 10 of 19 IT articles in connection to centralization. During centralization departments or functions were combined and optimized by reducing redundant information and tasks (Turle, 2010). With an increased transparency, shared service centers had more relevant information and thus responded quicker to requests (Borman & Janssen, 2012; Guo et al., 2010; Davis, 2005; Goh et al. 2007; Griffin, 1981).

Concerning standardization, distinctions were made in literature in regard to each function. Standardization was described in 11 of the 19 IT shared service related articles and in 7 out of 8 SCM shared service related articles. Two articles in SCM elaborated a bit further about standardization. In IT, standardization refers mainly to process and application standards (Miskon et. Al, 2013). Depending on the intended specialization of the shared service center the IT architecture has to be implemented with specialized features and adjusted (Scannell & Bannister, 2012). After implementing shared services, software and hardware can be standardized (Becker et al., 2009). Examples of IT applications that can be standardized are for example portal and flow applications (Guo et al., 2010). For web services, standard internet protocols can be implemented (Baida, 2004). In SCM, administrative systems can be standardized in order to make processes such as order-to-procure more responsive (Herbert & Seal, 2012). Standardized key services are for example, EPCIS and DS (Kang & Lee, 2013). Altogether a common enterprise resource planning system does not only centralize information and communication but also puts a standard on system usage. After standardizing processes in IT as well as in SCM, policies have to be adopted (Grant et al., 2006).

Administrative characteristics were pointed out in 16 of 19 IT shared service articles and in each of the SCM shared service articles, which amounts to 8 articles. Tasks within this dimension can be of managerial as well as of tactical nature (Scannell & Bannister, 2012; Becker et al., 2009; Guo et al., 2010; Goh et al., 2007). Via administration, the shared service center has to establish communication systems, performance management and setting overall directions (Ratz et al., 1991). Training and scheduling of staff has to be managed in IT and SCM areas in addition to recording day-to-day activities with frequent updates on developments (Ratz et al., 1991; Turle, 2010). Special characteristics in organizing administrative tasks in IT were related to user support, server management and activities related to programming (Nasir et al., 2011; Blake et

al., 2010; Godse, 2012). Communication is enhanced via the organization of communication protocols such as different messengers (Bai et al., 2008; Qian, 2010; Zhang et al., 2010). The key is to organize activities in IT via a shared host platform. In SCM, a particular focus lies on cost reductions, thus purchasing activities are closely examined in order to derive to further cost savings (Turle, 2010). Starting with supplier selection activities, which can be on regional or global basis, the shared service center has to find the supplier with the most competitive prices (Turle, 2010). Due to global sourcing, the shared service center can choose from a regional, national or international base of suppliers in order to find suppliers with low prices (Davis, 2005). Administrative tasks involve for example cost calculations. Information search on currency fluctuations is part of the task as suppliers are globally dispersed and thus different currencies could have a different influence on the unit price of an item (Davis, 2005).

Complexity of the work force and tasks has been mentioned in 15 of 19 IT shared service articles, while it has been recorded in 7 of 8 SCM shared service articles. Since the shared service center is specialized in a particular field, specialized experts are needed (Janssen & Joha, 2006). Due to the sophistication of systems, teamwork is often applied (Herbert & Seal, 2012). Regarding the complexity of organizing tasks and functions within the work force, articles in IT found that highly specialized IT experts are needed in addition to skilled managers with IT knowledge (Janssen & Joha, 2006). In order to enable proper communication between IT experts and the customer, managers act as bridge for transferring information (Janssen & Joha, 2006). Specialist teams have to be able to implement and maintain information systems. In SCM, IT activities related to the usage of enterprise resource systems are involved in the daily tasks, which creates similarly the need of specialists. Moreover, clerical administration tasks have to be solved by staff (Davis, 2005). An additional task of managers is related to processing financial information (Herbert & Seal, 2012).

The dimension control was described in 11 of 19 IT shared service related articles and in 5 of 8 SCM related shared service articles. Within the dimension of control, very little has been mentioned on organizing features related to IT and SCM. In both fields, stakeholders influence the overall direction, which is mainly financially driven (Becker et al., 2009; Grant et al., 2006; Ratz et al., 1991). Accountability and responsibility is assigned in order to guarantee the retention of interest of the different stakeholders. The shared service center is semi-autonomous (Herbert & Seal, 2012). Service level agreements determine the conditions of business interactions and ensure safety regulations in case of non-compliance with the contract. Control of processes is done via performance management (Goh et al., 2007). Performance metrics are used to measure the value of outcomes of individual processes for the corporation. Information systems facilitate the control and transparency of processes, for example by using an open system exchange with a semantic web-based platform (Mitra & Poellabauer, 2011; Pinto, 2010). Those web-based platforms are used to share services with different parties (Mitra & Poellabauer, 2011). Applications are used to manage and improve processes. While in SCM, procurement rules guide processes and are thus crucial for organizing tasks such as supplier contracting (Turle, 2010). In addition, they establish conditions for the supplier-buyer-relationship.

Limitations within this research, regard the selection of articles, which were not purely IT or SCM related, but were mentioning for example SCM related activities. In this way, data was depicted and analyzed. To sum it up, special characteristics are purely based on different activities that are due to different functions, for example the order-to-procure activity that is commonly used in SCM. And in relation to this matter the organization depends on the kind of activity. Altogether, there is still a lack of literature concerning special functions in shared services. The outcome provides evidence that there are structural similarities besides the difference in general activity of each function.

For future research, a crucial point is that there is a missing specific distinction of SCM shared services or IT shared services and shared services in general. Thus, establishing definitions for different shared services is necessary. After an in-depth analysis of the found samples, it became clear that a suitable categorization of shared services in the field of IT was missing, as information systems are used within basically all fields. The question was, when would a shared service count as an IT shared service. Therefore, there was a fine line between the fields, which was sometimes not distinguishable. For SCM, little was found on clear usage of SCM. A definition of SCM related shared services could help future researchers to develop and test new hypothesis in order to expand the knowledge and literature within SCM shared services. A suggestion for a possible definition would include sourcing activities in regard to contracting, supplying, storing and delivering organized by a shared service center. In regard to another research similar to this one, but based on the exploration of the organization of shared services in general, the outcome of Friebe (2013) also suggested a lack of literature.

6. CONCLUSION

After a thorough literature review intending to discover special characteristics of the organization of shared services in the field of Information Technology and Supply Chain Management, this paper attempts to accumulate data within the narrow range of available literature in the field of IT shared services and SCM shared services.

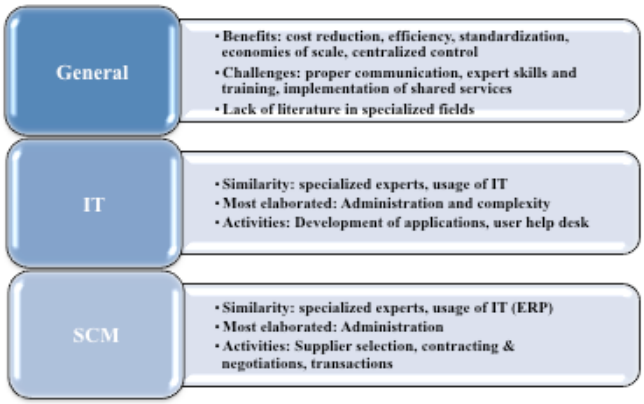

Figure 3.Highlights of the Outcome

Findings suggested that the dimension administration was one of the most mentioned and elaborated ones within both fields. Thus, the administration of activities implied the most highlighted differences within the two fields. For example, SCM activities such as selection, negotiation and contracting of suppliers play an incremental role when it comes to organizing characteristics. Complexity was the second most developed dimension. Literature examined the specialization of the work force, with the result that specialized expert teams are needed within SCM as well as IT in order to handle complex information systems. With the maturation of sophisticated information systems, the future trend will go towards a shift of tasks within the work force and an even higher need of experts.

Dimensions such as centralization, standardization and control were often mentioned in the literature, yet little was elaborated on organizational structural elements. Altogether, both fields have been little examined and organizational elements were mostly mentioned as a side comment in literature. Thus, there is still a tremendous space of improvement and exploration of shared services in those two fields possible. Nevertheless, the outcome shows rather similarities in the organization of shared services than differences.

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APPENDIX

A. Search Process and Sample

A.1 Search Process of IT Shared Service Articles

Search Engine	Search Word	Hits	Language Filter	Hits	Search Within	Hits	Subject Ares/Topic	Hits	Keywords	Hits
Scopus	"shared services" information technology	96	-	96	-	96	Computer Science; Business, Management & Accounting; Economics, Econometrics & Finance	50	-	50
Scopus	"shared services"	2614	-	2614	-	2614	Computer Science	189	Shared services, Shared service center	100
Scopus	"shared service center" information technology	15	-	15	-	15	-	15	-	0
Science Direct	"shared services" information technology	738	-	738	-	738	Shared Services	14	-	14
Total	**-**	**3463**	**-**	**3463**	**-**	**3463**	**-**	**268**	**-**	**164**

After reading each article in depth, more articles were sorted out depending on their fit to the topic. The final sample comprised 19 articles for IT.

A.2 Search Process of SCM Shared Service Articles

Search Engine	Search Word	Hits	Language Filter	Hits	Search Within	Hits	Subject Ares/Topic	Hits	Keywords	Hits
Scopus	"shared services" purchasing	572	English	568	-	568	Computer Science; Business, Management & Accounting; Materials Science; Social Science	33	-	33
Scopus	"shared services" supply	197	-	197	-	197	Computer Science; Business, Management & Accounting; Economics, Econometrics & Finance; Social Science	11	-	11
Scopus	"shared service center" purchasing	0	-	0	-	0	-	0	-	0
Scopus	"shared service center" supply	2	-	2	-	2	-	2	-	0
Science Direct	"shared services" purchasing	229	-	229	-	229	Shared Services, Information Systems, Information Technology, Business Unit, Resource Management, Service Unit, Strategic Management, Outsourcing	33	-	33
Science Direct	supply	1147176	-	1147176	"shared services"	471	Business Process, Business Unit, Shared Services, Information Systems, Information Technology, Supply Chain, Outsourcing, Management Control, Management Systems, Organizations	61	-	61
Total	**-**	**1148176**	**-**	**1148172**	**-**	**1467**	**-**	**140**	**-**	**138**

After reading each article in depth, more articles were sorted out depending on their fit to the topic. The final sample comprised 8 articles for SCM.

A.3 Sample of IT Shared Service Articles

	IT Sample
1	Bai, Q., Su, X., Liu, Q., Terhorst, A., Zhang, M., & Mu, Y. (2011). Case-based trust evaluation from provenance information, Changsha
2	Baida, Z., Gordijn, J., Omelayenko, B., & Akkermans, H. (2004). A shared service terminology for online service provisioning, Delft.
3	Becker, J., Niehaves, B., & Krause, A. (2009). Shared services strategies and their determinants: A multiple case study analysis in the public sector, San Francisco, CA.
4	Borman, M., & Janssen, M. (2012). Reconciling two approaches to critical success factors: The case of shared services in the public sector. International Journal of Information Management.
5	Day, K. J., & Norris, A. C. (2006). Supporting information technology across health boards in New Zealand: Themes emerging from the development of a shared services organization. Health Informatics Journal, 12(1), 13-25.
6	Day, K. J., & Norris, A. C. (2007). Supporting information technology across health boards in New Zealand: The role of learning in adapting to complex change. Health Informatics Journal, 13(3), 195-206.
7	Godse, M. (2012). Exploiting the values of shared services, Mysore.
8	Goh, M., Prakash, S., & Yeo, R. (2007). Resource-based approach to IT shared services in a manufacturing firm. Industrial Management and Data Systems, 107(2), 251-270.
9	Grant, G., McKnight, S., Uruthirapathy, A., & Brown, A. (2007). Designing governance for shared services organizations in the public service. Government Information Quarterly, 24(3), 522-538. doi: http://dx.doi.org 10.1016/j.giq.2006.09.005
10	Guo, Q., Chang, G., Sun, D., & Wang, X. (2010). Shared service architecture for emergency management system development, Shenzhen.
11	Lee, H. S., Ahn, S. H., Kim, K. Y., Yu, J. J., Kim, D. S., & Lee, B. G. (2007). Innovative system model of the shared services for IT SMEs in Korea, Luoyang, Henan.
12	Miskon, S., Fielt, E., Bandara, W., & Gable, G. (2013). Towards a typology of structural arrangements for shared services: evidence from the higher education sector. Electronic Markets, 1-14.
13	Mitra, P., & Poellabauer, C. (2011). Service sharing in mobile sensing systems, Houston, TX.
14	Nasir, I. N., Abbott, P., & Fitzgerald, G. (2011) Shared services centres: A case study on a dispersed services oriented organization. 2011 5th Workshop on Global Sourcing: New Studies in Global IT and Business Service Outsourcing: Vol. 91 LNBIP (pp. 175-200). Courchevel.
15	Pinto, A. S. (2010) E-learning as a shared service in shared services centers. International Conference on ENTERprise Information Systems, CENTERIS 2010: Vol. 110 CCIS (pp. 364-373). Viana do Castelo.
16	Qian, S. (2010). Shared services analysis of distributed heterogeneous database based on BS model, Chengdu.
17	Scannell, M., & Bannister, F. (2012) Shared services in Irish local government. 11th IFIP WG 8.5 International Conference on Electronic Government, EGOV 2012: Vol. 7443 LNCS (pp. 114-125). Kristiansand.
18	Yale-Loehr, A., Schlesinger, I. D., Rembert, A. J., & Blake, M. B. (2010). Discovering shared services from cross-organizational software specifications, Miami, FL.
19	Zhang, Q., Xiao, J., Gurses, E., Karsten, M., & Boutaba, R. (2010) Dynamic service placement in shared service hosting infrastructures. 9th International IFIP-TC6 Networking Conference, NETWORKING 2010: Vol. 6091 LNCS (pp. 251-264). Chennai.

A.4 Sample of SCM Shared Service Articles

	SCM sample
1	Davis, T. R. V. (2005). Integrating shared services with the strategy and operations of MNEs. Journal of General Management, 31(2), 1-17.
2	Griffin, A., & Adams, S. (1981). Shared services—A recipe for cost-cutting in hospitals. Long Range Planning, 14(6), 76-79. doi: http://dx.doi.org/10.1016 0024-6301(81)90063-7
3	Herbert, I. P., & Seal, W. B. (2012). Shared services as a new organisational form: Some implications for management accounting. The British Accounting Review, 44(2), 83-97. doi: http://dx.doi.org/10.1016/j.bar.2012.03.006
4	Kang, Y. S., & Lee, Y. H. (2013). Development of generic RFID traceability services. Computers in Industry, 64(5), 609-623.
5	McIvor, R., McCracken, M., & McHugh, M. (2011). Creating outsourced shared services arrangements: Lessons from the public sector. *European Management Journal*, *29*(6), 448–461. doi:10.1016/j.emj.2011.06.001
6	Ratz, J. E., Chenoy, N. C., & Morrison, M. J. (1991). Planning for Shared Services: Lessons from Experiences of The Princess Margaret Hospital. Healthcare Management Forum, 4(2), 3-11. doi: http://dx.doi.org/10.1016 S0840-4704(10)61239-2
7	Rothwell, A. T., Herbert, I. P., & Seal, W. (2011). Shared service centers and professional employability. Journal of Vocational Behavior, 79(1), 241-252. doi: http://dx.doi.org/10.1016/j.jvb.2011.01.001
8	Turle, M. (2010). Shared services: An outline of key contractual issues. Computer Law and Security Review, 26(2), 178-184.

B. Findings

B.1 Scaled Elaboration of Each Dimension per Article in SCM

Articles/dimensions	Centralization	Standardization	Administration	Complexity	Control
Chenoy, Morrison,Ratz, 1991	0	1	1	1	1
Davis, 2005	2	1	1	1	1
Griffin, 1981	1	1	1	1	0
Herbert & Seal, 2012	1	1	1	2	1
Kang& Lee, 2013	1	2	1	0	0
McIvor, McCracken, McHugh, 2011	1	1	1	1	1
Rothwell, Herbert, Seal, 2011	1	1	1	1	0
Turle, 2010	1	0	2	1	2
Total (of 8 articles)	**7/ score: 8**	**7/score: 9**	**8/score: 12**	**7/ score: 8**	**5/ score:8**

B.2 Scaled Elaboration of Each Dimension per Article in IT

Articles/dimension	Centralization	Standardization	Administration	Complexity	Control
Abbott, Fitzgerald, Nasir, 2011	1	1	1	2	1
Bai, Shu, Yang, 2008	0	0	1	0	0
Baida, Gordijn, Omelayenko, 2004	0	1	1	2	0
Bandara, Fielt, Gable, Miskon, 2013	1	1	1	1	0
Bannister & Scannell, 2012	1	1	1	1	1
Becker, Niehaves, Krause, 2009	1	1	1	1	1
Blake, Rembert, Schlesinger, Yale-Loehr, 2010	0	0	1	0	0
Borman & Janssen, 2012	1	1	1	2	1
Boutaba, Guerses, Karsten, Xiao, Zhang, 2010	1	0	1	2	1
Brown, Grant, McKnight, Uruthirapathy, 2006	0	1	2	1	2
Chang, Guo, Sun, Wang, 2010	1	1	1	1	1
Day & Norris, 2006	0	0	0	2	0
Day & Norris, 2007	0	0	0	1	0
Godse, 2012	1	1	1	1	1
Goh, Prakesh, Yeo, 2007	1	1	1	1	1
Lee et al., 2007	0	0	1	1	0
Mitra & Poellabauer, 2011	0	0	0	0	1
Pinto, 2010	1	1	1	1	1
Qian, 2010	0	0	1	0	0
Total (of 19 articles)	**10/score: 10**	**11/score:11**	**16/score:17**	**15/score:20**	**11/score:12**

B.3 Notes per Dimension in IT

Articles/dimensions	Centralization	Standardization	Administration	Complexity	Control
Brown, Grant, McKnight, Uruthirapathy, 2006	-	mentioned, strategic from operational seperated:services and corporate policy/standards	governance structure: managerial & tactical; customer focus/service mix/location/cost recovery/risk/performance/legislative/	layers: division of tasks, different structure	governance structure: different tier-boards, power from executive, national, managerial, tactical levels: committee and boards
Becker, Niehaves, Krause, 2009	IT service provider as main hub in network, ss: IT procurement (overlap with SCM)	standard soft- and hardware, mass-operation data centre or mass printing and enveloping	IT-consulting&training, integration&customization of applications,	key actor as central promoter	financially driven
Bannister & Scannell, 2012	power struggle for central control, reduce costs 25-30%, avoid duplication	find one ICT system, of applications, processes and underlying architecture	align ICT with performance goals, needs to be actively designed	strategic management , strong central leadership for adoption of ss, frustration at user level,	internal, separate, wholly onwed, outsource to other parties, assign accountability, engagement of stakeholders
Abbott, Fitzgerald, Nasir, 2011	mentioned	specialization	IT: user support, server management, programming	service provider: internal or external entity; help desk(customer contact), functional (task execution, expert (technical support); employee undergoes SAP training	SLA reports for performance: ERP transactions analysis
Boutaba, Guerses, Karsten, Xiao, Zhang, 2010	dynamic scaling of service deployment, allocate resources, centralized controllers	-	shared hosting platform for developing web applications; cloud computing, content delivery networks	infrastructure provider (owns hosting environment), service provider (rents to run service), client (service customer)	platform
Pinto, 2010	mentioned	mentioned	info flow and process facilitator, decrease admin costs, using metadata to tag, describe, search	improve knowledge and skills of workers=> increasing org knowledge	open system exchange, semantic web related as platform for e-learning , communication
Goh, Prakesh, Yeo, 2007	attempted in case study => 40systems to one	mentioned	clear direction, communication system, clearly-defined processes	staff functions in semi-autonomous org, business unit,IT management team: understand capabilities, deliver service	TQM, performance metrics, charge back processes
Bai, Shu, Yang, 2008	-	-	integration of different computing modes, communication protocols, platforms and data structures	-	-
Qian, 2010	-	-	distribute heterogenous database access for web environment	-	-
Blake, Rembert, Schlesinger, Yale-Loehr, 2010	-	-	service-oriented architecture	-	-
Lee et al., 2007	-	-	purely IT based improvement technologies and improvement of IT policies	training sessions to pass know-how => skilled staff	-
Mitra & Poellabauer, 2011	-	-	-	-	novel subscription language: sharing resources e.g. network connections and information, e.g. database entries
Bandara, Fielt, Gable, Miskon, 2013	yes	mentioned as benefit, of application and processes	backbone of administration	top management support, strong project management, mismanagement of staff	-
Chang, Guo, Sun, Wang, 2010	concentration, distribution, fast	data service: final users, portal apps, flow apps, common web apps	SOA, dynamic and flexible scheduling	heterogeneous resources layer, unified integration layer, unified access layer for emergency management center	unified decision making platform by shared data and business service layer
Borman & Janssen, 2012	sharing and distribution of IT-cost-benefits	processes: one chosen as best practice	mentioned	staff relationship management, senior leadership, comprehensive training, community and change support, help desk, new tech	mentioned
Godse, 2012	mentioned	streamline and eliminate duplications	transaction based services: routine administration: devlopment and learning, compensation, etc.	yes, commercial aspect: customer/provider relationship, competitive pricing model, educating service executives	SLA for quick responding
Day & Norris, 2006	-	-	-	technical support, helpdesk, networking, hard/software, project management, training and web development	-
Baida, Gordijn, Omelayenko, 2004	-	standard internet protocol	mentioned	information modeling experts, business-oriented domain experts, software engineers, programmers	-
Day & Norris, 2007	-	-	-	workload changes, leadership, competition for resources => learning, communication as tool for zone of complexity	-

B.4 Notes per Dimension in SCM

Articles/dimensions	Centralization	Standardization	Administration	Complexity	Control
Griffin, 1981	proper exchange of information	for simplest categories no agreement was found for standardization	cost saving, government audit	work force related	-
Rothwell, Herbert, Seal, 2011	called a hybrid model:between line management control and open market, work force can work overseas,	routinizing activities by re-engineering, individual: not get promoted and lower level technician	explicit and tacit knowledge	work force, satisfaction	-
Kang& Lee, 2013	not specifically	core services: accessed constantly: e.g. EPCIS, ONS, DS: standardizing and combining for easier usability	need to include tracability requirements of various industries	-	-
Herbert & Seal, 2012	new variant of the traditional centralisation of support functions	standardisation of abdministration systems, cheaper junior staff, scale + new focus:also recruit top experst and professionals	cost management through transparency, administration is subject to process thinkking and re-engineering,	end-to-end processwith teams, workers with specific tasks for entire process streams, procurement-to-pay (purchasing), producers => users of financial information as result of SSC	control remains within hierachy, quasi-independent: hybrid model: market and in-house management control
Ratz, Chenoy, Morrison, 1991	-	action by government: increased standardization of information processing & sharing of services	organize planning and scheduling together (hospitals), kind of SS: purchased service, collaborative or fully shared, trouble: authority, responsibility, accountability, coroporate cultures need to be considered	reluctance among staff, mature org cannot change easily	has to be discussed between different parties/supplier/customer etc
McIvor, McCracken, McHugh, 2011	mentioned but general not on specific purchasing level	mentioned	mentioned	specialize and better service level, leverage external expertise, engage with vendors for sourcing	mentioned
Davis, 2005	payment easier controlled centrally, central management in supply chain: reduce build up in inventory, lower operating costs, improve customer service; order-to-cash transaction	reducing different accounting systems, introducing common metrics	common operating policies, regionally or globally: discounts from suppliers; foreign currency payments to suppliers	less finance support staff was needed, working capital was reduced, office clerical work ; expertise in IT then needed	rationalise product line, may be taked to regional centre from country subsidiary (support service). For hrm, legal and finance needs to be decided depending omn country
Turle, 2010	support departments can be combined and streamlined	-	budget is tight, savings via purchases, suppliers join shared services: advantages, expanding scope, suppliers bid for tender accoring to procurement rules, documention of day-to-day activities, monthly/quarterly updates to service recipient, service costs	communication barriers can be broken down: roles&functions in support department can be combined->faster comm., no duplication of data	via contractual structures, procurement rules; payment, governance, contract management&liability via purchasing bodywith total control; supplier relationship can be managed in that way; lack of direct control for participants and barrier/threat for entrants; security issues:trust etc